

REMARKS/ARGUMENTS

This Reply is being filed in response to the second non-final Official Action of December 21, 2005. Again, following Applicants' Preliminary Amendment of September 20, 2004, the present application includes currently pending Claims 1, 3-6, 8-11, 13-16 and 18-20. The second Official Action continues to reject Claims 1, 3, 4, 6, 8, 9, 11, 14, 16, 18 and 19 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,742,696 to Thompson; and reject all of the pending claims under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2005/0001010 to Koga et al.. Also, the second Official Action continues to reject Claims 1, 3, 6, 8, 11, 13, 16 and 18 under 35 U.S.C. § 102(e) as being anticipated by either U.S. Patent No. 6,708,865 to Yoshinaga or U.S. Patent Application Publication No. 2004/0173663 to Okamoto et al. And now the second Official Action rejects Claims 1, 3, 6, 8, 11, 13, 16 and 18 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,050,475 to Kinton et al., which is assigned to McDonnell Douglas Corporation. As explained below, however, Applicants respectfully submit that the claimed invention is patentably distinct from the cited references, taken individually or in combination, and accordingly traverses the rejection of the claims as being anticipated thereby. In view of the following remarks, Applicants respectfully request reconsideration and allowance of all of the pending claims of the present application.

As explained in response to the first Official Action, independent Claim 1 recites a friction stir welding system that includes a friction stir welding (FSW) device and a controller. The FSW device includes an actuator capable of moving a FSW tool relative to a workpiece. In this regard, the actuator comprises a plunge actuator capable of moving the FSW tool along a plunge axis. The controller, in turn, is capable of controlling the FSW device to drive the actuator to move the FSW tool relative to the workpiece such that the FSW tool is capable of performing a friction stir welding operation on the workpiece. The controller is capable of monitoring a torque of the actuator. Accordingly, the controller is capable of controlling the FSW device to drive the actuator such that the torque is maintained within a range about a torque setting. More particularly, the controller is capable of controlling the FSW device such that the plunge actuator is driven to move the FSW tool into further contact with the workpiece when the

torque decreases below a range about a plunge torque setting. Conversely, the controller is capable of controlling the FSW device such that the plunge actuator is driven to move the FSW tool into reduced contact with the workpiece when the torque increases above the range about the plunge torque setting.

As explained in response to the first Official Action, similar to the claimed invention, the Campbell patent, Thompson patent, Koga publication, Yoshinaga patent and Okamoto publication disclose friction stir welding systems and methods. In contrast to the claimed invention, however, none of the aforementioned references, individually or in combination, teach or suggest monitoring the torque of a plunge actuator capable of moving the FSW tool along a plunge axis, or accordingly controlling a FSW device such that the plunge actuator is driven to move the FSW tool into further or reduced contact with the workpiece based upon the torque and a range about a plunge torque setting. Similarly, we note that the newly cited Kinton patent does not teach or suggest the aforementioned feature of the claimed invention. In this regard, the Kinton patent discloses a friction stir welding device and method for optimizing the depth of a friction stir welding (FSW) tool in a workpiece. As disclosed, the welding device includes a sensor in electrical communication with a controller for measuring the magnitude of force exerted by the welding tool upon the workpiece. The sensor can include, for example, one or more dynamometers for measuring torque. Even in this instance, however, the Kinton patent discloses monitoring the magnitude of force relative to a predetermined range or value, as opposed to monitoring torque relative to a torque setting as in the claimed invention.

In responding to Applicants remarks with respect to the Campbell patent, Thompson patent, Koga publication, Yoshinaga patent and Okamoto publication, the second Official Action explains that the plunge axis and rotational axis coincide, and that the spindle actuator serves the same function as the plunge actuator, which controls the depth of penetration. Considering these remarks, it appears as though the second Official Action is confusing the plunge and spindle actuators. In this regard, even considering that the plunge axis and rotational axis may coincide, the spindle actuator serves to rotate a FSW tool about the plunge/rotational axis, i.e., the spindle actuator rotates the FSW tool such that its axis of rotation is the plunge/rotational axis. The plunge actuator, on the other hand, serves to move the FSW tool along the plunge/rotational axis.

i.e., the plunge actuator advances and/or refracts the FSW tool in a direction defined by the plunge/rotational axis. Thus, the spindle actuator does not, in fact, serve the same function as the plunge actuator.

Applicants therefore respectfully submit that the claimed invention of independent Claim 1, and by dependency Claims 3-5, is patentably distinct from the Campbell patent, Thompson patent, Koga publication, Yoshinaga patent, Okamoto publication and Kinton patent, taken individually or in combination. Applicants also respectfully submit that all of independent Claims 6, 11 and 16 recite subject matter similar to independent Claim 1. For example, independent Claims 6, 11 and 16 recite monitoring the torque of a plunge actuator capable of moving the FSW tool along a plunge axis, or accordingly controlling a FSW device such that the plunge actuator is driven to move the FSW tool into further or reduced contact with the workpiece based upon the torque and a range about a plunge torque setting. Accordingly, Applicant respectfully submits that the claimed invention of independent Claims 6, 11 and 16, and by dependency Claims 8-10, 13-15 and 18-20, is patentably distinct from the Campbell patent, Thompson patent, Koga publication, Yoshinaga patent, Okamoto publication and Kinton patent, taken individually or in combination, for at least the same reasons given above with respect to independent Claim 1. Applicant therefore respectfully submits that the rejections of Claims 1, 3-6, 8-11, 13-16 and 18-20 under 35 U.S.C. § 102 as being anticipated by one or more of the Campbell patent, Thompson patent, Koga publication, Yoshinaga patent, Okamoto publication and Kinton patent are overcome.

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CONCLUSION

In view of the remarks presented above, Applicants respectfully submit that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicants' undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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